



PATENT
Attorney Docket No. 07044.0002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

| | | |
|-----------------------------|---|-----------------------------|
| In re Application of: |) | |
| |) | |
| Kheng Chiong TAY et al. |) | Group Art Unit: 2893 |
| |) | |
| Application No.: 10/766,468 |) | Examiner: Matthew L. REAMES |
| |) | |
| Filed: January 29, 2004 |) | Confirmation No.: 3727 |
| |) | |
| For: SURFACE MOUNT |) | |
| OPTOELECTRONIC COMPONENT |) | |

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

DECLARATION UNDER 37 C.F.R. § 1.131

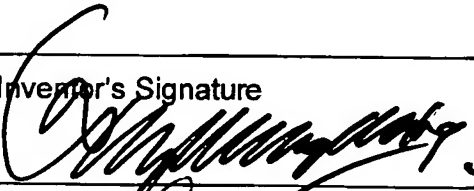
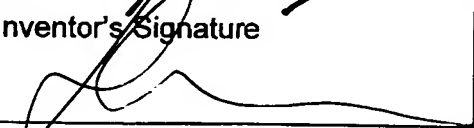

We, the undersigned, state as follows:

1. We are the named inventors of the subject matter described and claimed in the above-identified U.S. patent application ("the U.S. application").
2. We completed the invention as described and claimed in the U.S. application in Malaysia at some point before July 3, 2001. In support of this statement, we attach to this declaration a copy of counterpart Malaysian patent application no. PI 20013160 ("the Malaysian application"), for which we are the named inventors and which discloses essentially the same subject matter as the U.S. application. We further attach to this declaration a copy of the Certificate of Filing for the Malaysian application (redacted to exclude our passport numbers, which are not believed to be relevant), which shows that the Malaysian application was filed in Malaysia on July 3, 2001.

3. We made a prototype of an embodiment according to the invention as described and claimed in the U.S. application in Malaysia at some point before October 4, 2002. In support of this statement, we attach to this declaration a copy of a technical drawing (redacted to exclude unnecessary information), which is dated December 15, 2001, and which shows a view of that prototype similar to views illustrated in the U.S. application.

We declare further that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further, that the statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the U.S. application or any patents issuing thereon.

Respectfully submitted,

| | | |
|---|--|-----------------|
| Full Name of First Inventor Tay Kheng Chiong | Inventor's Signature  | Date 1/12/08 |
| Full Name of Second Inventor Lai Khin Shin | Inventor's Signature  | Date 1/12/08 |
| Full Name of Third Inventor Low Tek Beng | Inventor's Signature  | Date 1/12/08 |

SURFACE MOUNT OPTOELECTRONIC COMPONENT

FIELD OF INVENTION

5 The invention relates to a surface mount optoelectronic component. The component is designed to be able to serve multiple modes of illumination; top, side and bottom depending on the method of mounting. The mounting connections are provided by the inherent electrically conductive base material. No mechanical forming process is required to produce the desired mounting connection. The invention is also capable of higher heat dissipation
10 due to the thicker base material used and the heat sink incorporated into the design.

BACKGROUND OF THE INVENTION

In order to fulfill the different customers' requirements, different component configurations
15 are available in the market today. Two key physical variations normally discussed for optoelectronic components are illumination direction and lead bending.

For illumination direction, customers may opt for either the top or side illumination version. As the name implies, top illuminators have an illumination source on the top of the
20 component surface while side illuminators have a source on the side of the component. The choice depends very much on the application itself. However, each of these configurations is unique in terms of physical dimension and is not interchangeable. Customers are expected to order the specific type for their needs.

As for lead bending, common versions available in the market include the J-bend, gull-wing, reverse gull-wing and etc. These are the configurations for the mounting connections onto sub-systems such as PCBs. Based on current market information; there are still no surface mount optoelectronic packages that do not require mechanical forming to create the desired mounting connections.

BRIEF DESCRIPTION OF DRAWINGS

The drawings enclosed are as follows:

10

Figure 1A is a three-dimensional top view of the invention.

Figure 1B is a three-dimensional bottom view of the invention.

15 Figure 2 is a cross sectional view of the invention depicting the assembly consisting of base material, plastic housing, optoelectronic chip and cavity within the plastic housing which is filled by a transparent or translucent resin material.

20 Figure 3 shows the invention being mounted onto a PCB using the side protrusions as a means for electrical connection.

Figure 4 shows the invention being mounted onto a PCB, similar to Figure C but on a reverse orientation so as to provide bottom illumination.

DETAIL DESCRIPTION OF THE INVENTION

The invention relates to a surface mount optoelectronic component.

5 With reference to the invention, the optoelectronic component is based on the surface mount technology. A thick electrically conductive material (1) is used to serve as the base for the assembly. An opaque plastic material (2) is used to provide the housing for the whole component. A cavity (5) is designed within the plastic material. An optoelectronic chip (3) is mounted within this cavity. This cavity is filled with a hard transparent or translucent resin
10 material so that optical radiation may be transmitted or received via this window. Electrical connection(s) between the chip and the base material is provided by a metallic wire (4).

Subsequent connections to the external sub-systems such as PCBs are provided by the base material itself; typically by soldering. No extra mechanical forming processes are necessary
15 to create the external connections. The base material extends all the way from the middle to the bottom (8) and to one of the side walls (7); until the extend of protruding outside the plastic package. The bottom surface (8) will be used for connection when a top illuminator is required. Alternatively, the side surface (7) could be used for connection if the component is used as a side illuminator. This feature ultimately yields a universal package design for
20 optoelectronic components where both top and side illumination capabilities are combined into one single package. The base material also protrudes to the other sides of the package (6). These protrusions act as heat sinks to improve heat dissipation from the component.

In another mounting configuration, these side protrusions (6) can also be used as a means of connection to external surfaces such as PCBs as illustrated in Figure C and D. In this case, the component will sit into the sub-system i.e. PCB and can be used for top and also bottom illumination. This mounting configuration will reduce the height profile of the component
5 above the sub-system since a portion of the component is below the sub-system's surface. The other two exposed surfaces (7) and (8) will then act as heat sinks instead when used in such manner.

Inherent in the design, no lead forming is required since the external connections are
10 provided by the base material. This feature eliminates mechanical stresses that are typically subjected to package during conventional forming processes. Consequently, the package robustness and reliability is greatly enhanced.

Another inherent feature of this invention is its relatively thicker base material compared to
15 other corresponding products in the market. This coupled with the 'heat sinks' greatly improves the package's ability to dissipate heat. Higher current or power could be applied to the devices to yield better performance.

CLAIMS.

1. An optoelectronic component based on the surface mount technology, said component comprising
- 5 a electrically conductive material (1),
- an opaque plastic material (2), and
- 10 a cavity (5),
- wherein the said electrically conductive material (1) serves as a base for the assembly, the said opaque plastic material (2) provides a housing for the whole component, and the said cavity (5) is located within the plastic material where an optoelectronic chip (3) is
- 15 mounted in.
2. An optoelectronic component as claimed in claim 1, wherein the cavity (5) is filled with a transparent and translucent resin material.
- 20 3. An optoelectronic component as claimed in claim 1, wherein electrical connection(s) between the chip (3) and the base material is provided with a metallic wire (4).

4. An optoelectronic component as claimed in claim 1, wherein initial base material provides connecting terminals to the external sub-systems such as PCBs.
5. An optoelectronic component as claimed in claim 1, wherein the said base material protrudes from the middle to the bottom (8) and to one of the sidewalls (7).
6. An optoelectronic component as claimed in claim 5, wherein the said base material protrudes outside the plastic package.
- 10 7. An optoelectronic component as claimed in claim 1, wherein the said base material protrudes to the two other sides (6) of the plastic package.
8. An optoelectronic component as claimed in claim 1, wherein the side protrusions can be used for electrical connections.

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SURFACE MOUNT OPTOELECTRONIC COMPONENT

ABSTRACT

5 The invention relates to a surface mount optoelectronic component. A thick electrically conductive material (1) is used to serve as the base for the assembly. An opaque plastic material (2) is used to provide the housing for the whole component. A cavity (5) on the top surface is designed within the plastic material. An optoelectronic chip (3) is mounted within this cavity. This cavity is filled with a hard transparent or translucent resin material so that
10 optical radiation may be transmitted or received via this window. Electrical connection(s) between the chip and the base material is provided by a metallic wire (4). Subsequent connections to the external sub-systems such as PCB are provided by the base material itself. No extra mechanical processes are necessary to create the connections. The base material extends all the way from the middle to the bottom (8) and to one of the side walls (7); until
15 the extend of protruding outside the package. The bottom surface (8) will be used for connection when a top illuminator is required. Alternatively, the side surface (7) could be used for connection if the component is used as a side illuminator.

The Most Illustrative Drawing: Figure 1A

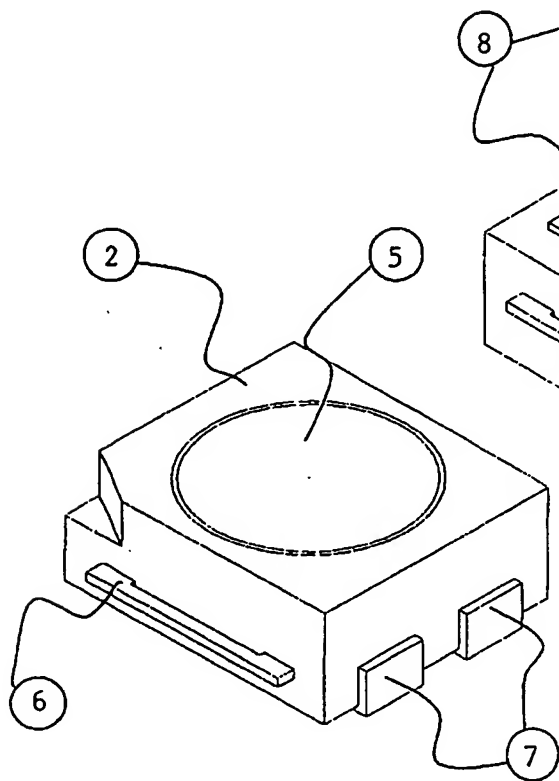


Figure 1A

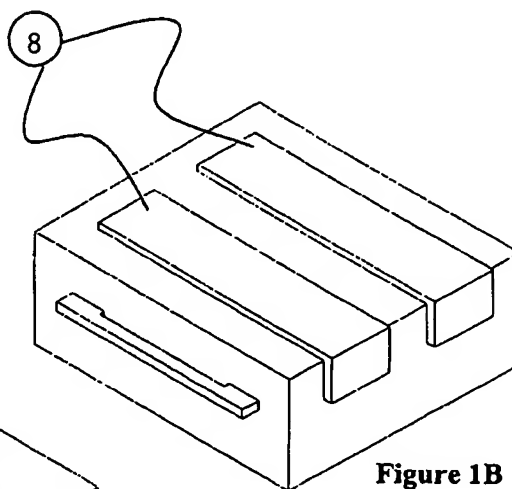


Figure 1B

Extension

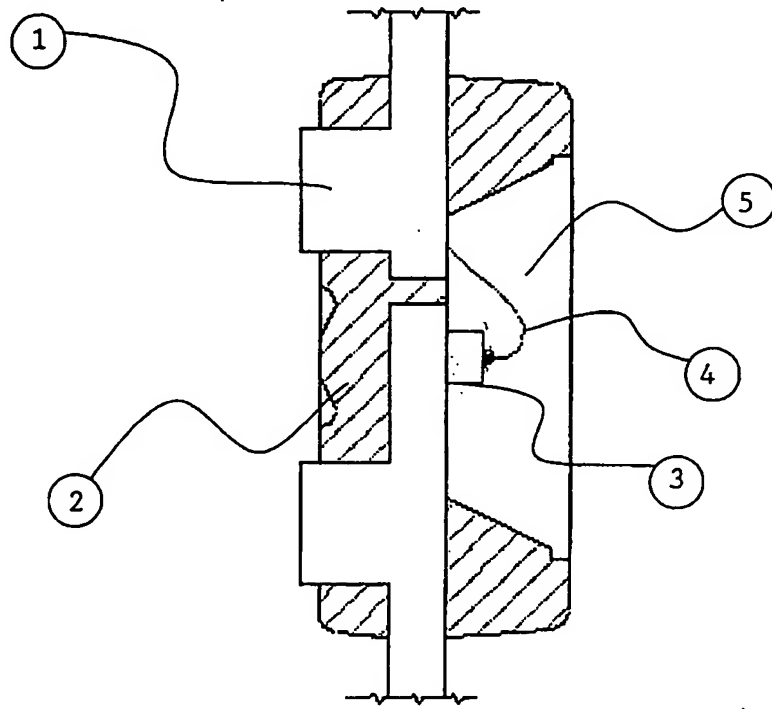


Figure 2.

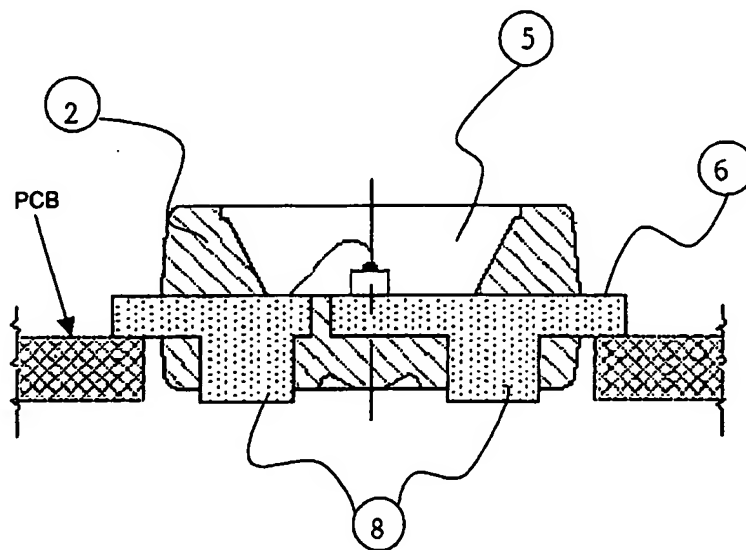


Figure 3

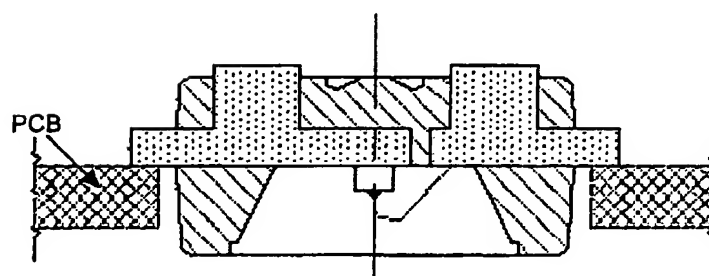


Figure 4



KEMENTERIAN PERDAGANGAN DALAM NEGERI
DAN HAL EHWAL PENGGUNA MALAYSIA
BAHAGIAN HARTA INTELEK,
TINGKAT 27 & 32,
MENARA DAYABUMI,
JALAN SULTAN HISHAMUDDIN,
50623 KUALA LUMPUR.
Ministry of Domestic Trade and Consumer Affairs Malaysia
Intellectual Property Division.


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CERTIFICATE OF FILING

APPLICANT : 1) TAY KHENG CHIONG
2) LAI KHIN SHIN
3) LOW TEK BENG
APPLICATION NO. : PI 20013160
REQUEST RECEIVED ON : 03/07/2001
FILING DATE : 03/07/2001
AGENT'S/APPLICANT'S : SD/PAT/2400372/ZRS/GPE/SMS
FILE REF.

Please find attached, a copy of the Request Form relating to the above application, with the filing date and application number marked thereon in accordance with Regulation 25(1).

Date : 13/07/2001


.....
(Hasnon Bt. Alang Mohd Rashid)
for Registrar of Patents

To : **WONG SAI FONG**
M/s SHEARN DELAMORE & CO,
7TH FLOOR, WISMA HAMZAH-KWONG HING,
NO. 1, LEMBOH AMPANG,
50100-KUALA LUMPUR
MALAYSIA



FF 09

III. INVENTOR(S)

The Applicant(s) is/are the inventor(s):

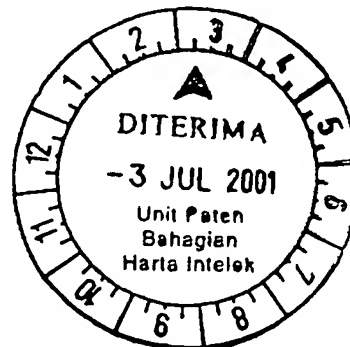
Yes ☒

No ☐

If no, the Applicant(s) hereby designate(s) the following as inventor(s):

Name _____

Address _____



Additional inventors indicated on supplementary sheet ☐

Additional information

20013160

IV. AGENT OR REPRESENTATIVE

The Applicant(s) has/have appointed a patent agent in the accompanying Form 17 Yes ☒ No ☐

Patent Agent's Registration number: PA 86/0003 and 86/0004...

Applicants have appointed
to be their common representative.

V. DIVISIONAL APPLICATION

This application is a divisional application: ☐

The benefit of the filing date ☐ and priority date ☐ of the initial application is claimed in as much as the subject matter of the present application is contained in the initial application identified below:

Initial application number:

Date of filing of initial application:

VI. DISCLOSURES TO BE DISREGARDED FOR PRIOR ART PURPOSES

(a) Disclosure was due to acts for the applicant or his predecessor-in-title ☐

Date of disclosure:

(b) Disclosure was due to the abuse of rights of applicant or his predecessor-in-title ☐

Date of disclosure:

A statement specifying in more detail the facts concerning the disclosure Yes ☐

Accompanies this Form No ☐

Additional information (if any)

VII. PRIORITY CLAIM (if any)

The priority of earlier applicant(s) is/are claimed as follows:-

Country*

Application no.

Filing date (dd/mm/yy)

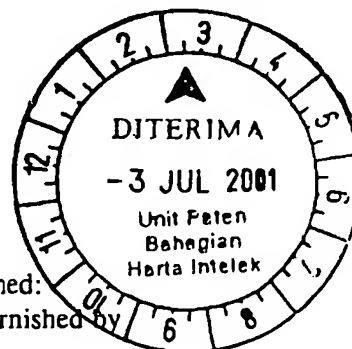
Symbol of the International Patent Classification:

If not yet allocated, please tick

The priority of more than one earlier application is claimed:

The certified copy of the earlier application(s) will be furnished by

The patent agent upon request



*if the earlier application is a regional or international application, indicate the office with which it is filed

20013160

Additional information (if any)

VIII. CHECK LIST

A. This application contains the following:

| | | | |
|----|-------------------|----|--------|
| 1. | Request (Form 1) | 04 | sheets |
| 2. | description | 04 | sheets |
| 3. | claim(s) | 02 | sheets |
| 4. | abstract | 01 | sheets |
| 5. | drawings (if any) | 03 | sheets |

TOTAL

14

B. This Form, as filed, is accompanied by the items checked below:

- | | | |
|----|---|-------------------------------------|
| a. | signed Form No. 17 | <input checked="" type="checkbox"/> |
| b. | declaration that inventor does not wish to be named in the patent | <input type="checkbox"/> |
| c. | statement justifying applicant's right to the patent | <input type="checkbox"/> |
| d. | statement that certain disclosure be disregarded | <input type="checkbox"/> |
| e. | priority document (certified copy of earlier application) | <input type="checkbox"/> |
| f. | cheque, cash, etc. for the payment of application fee | <input checked="" type="checkbox"/> |
| g. | other documents (specify) | <input type="checkbox"/> |

IX. SIGNATURE



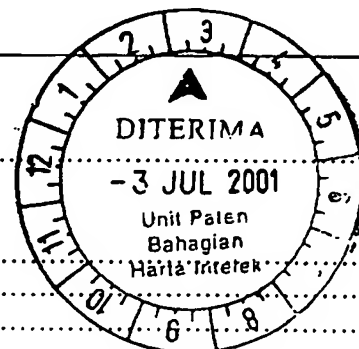
Name: WONG SAI FONG
Regn No.: PA 86/0003

July 3, 2001

date

For official use:

1. Date application received:
2. Date of receipt of correction, later filed papers, or drawings completing the application.



20013160

